

REMARKS

Reexamination and reconsideration of this application is requested. Claims 1, 3, 8-15, and 22 have been amended. After this Response, Claims 1-25 remain pending in this application. No new matter was added.

Rejection Under 35 U.S.C. 101

The Examiner rejected claims 8-14 under 35 U.S.C. 101 as being directed to non-statutory subject matter. The Applicants have amended claims 8-14 to more clearly recite “computer readable **storage product**”. Therefore, the Applicants respectfully believe that this rejection has been overcome and should be withdrawn.

Rejection Under 35 U.S.C. 102

The Examiner rejected Claims 1-25 under 35 U.S.C. §102(b), as being anticipated by Wipfel et al. (U.S. Patent No. 6,151,688).

Wipfel is directed towards detecting failures/possible failures by node software, node hardware, interconnects, and system area network switches. Wipfel is further directed to taking steps to compensate for failures and prevent problems such as uncoordinated access to a shared disk. Wipfel teaches that when a node or part of a system area network becomes inoperative, remote probing retrieves either a value identifying the problem or an indication that the remote memory is inaccessible. The retrieved value can include a counter, a validation value, a status summary, an epoch which is incremented (or decremented) by each restart or each reboot, a root pointer that bootstraps higher level communication with other cluster nodes, and a message area that provides additional diagnostic information.

Wipfel further teaches that remote memory probing allows the system to more effectively select between different compensating steps when an error condition occurs.

In a situation referred to as a "split brain" two or more nodes cannot communicate to coordinate access to shared storage. Thus, a significant risk arises that the node will corrupt data in their shared storage area. Wipfel teaches that an emergency message location on a shared disk can be utilized to remove the failed node from the cluster while allowing the failed node to be made aware of its status and thus prevent data corruption. The remaining active nodes may also coordinate their behavior through the emergency message location. When a node is disconnected from a cluster the invention provides methods that make reduced use of locks by coordinating locking with interrupt handling to release the global resources that were previously allocated to the node.

With respect to claims 1 and 8, the Examiner states that Wipfel teaches:

storing a set of resource equivalencies in memory

However, the Applicants respectfully disagree. The Examiner directs the Applicants to col. 8, lines 16-22 of Wipfel, where Wipfel merely states:

Each of the illustrated nodes 106 also contains resources 222 which have been allocated to the node 106 from the resource pool 212. As noted, the allocated resources may be memory buffers (residing in shared memory 220); credits toward bandwidth, priority or other scarce cluster 100 resources, or any other computational resource which it is more cost-effective to share among nodes than it is to dedicate permanently to each node"

The Applicants believe that the Examiner is reading Wipfel so broadly that what the Examiner claims Wipfel is teaching is outside the scope of Wipfel. This holds true for each and every claim element of the presently claimed invention. For example, Wipfel is completely silent on "resource equivalences". The above citation does not even mention or suggest anything close to "resource equivalences". The above citation only states that a node contains resources that have been allocated to it from a resource pool and can reside in shared memory. A resource pool is not "resource equivalences". A resource pool includes a plurality of resources with disparate functionalities while "resource equivalences" include resources that perform one or more substantially similar services/functions.

In fact, claim 1 and claim 8 have been amended to more clearly recite:

identifying a set of resource equivalencies based on at least one of
a user specification of resource equivalencies, and
automatic discovery of resource attributes related to the
user specification of resource equivalencies;

storing the set of resource equivalencies in memory, wherein each
resource in a resource equivalency performs substantially identical
services as other resources in the resource equivalency, the substantially
identical services corresponding to the user specification of resource
equivalencies”.

Nowhere does Wipfel teach or suggest this. Wipfel is completely silent on a user specification of resource equivalencies and automatic discovery of resource attributes related to the user specification. Wipfel does not disclose anything about richer relationships among resources. The resources in Wipfel are simply either local or global. Wipfel does not discuss resource relationships such as resources depending on each other or the ability to collocate certain resources with each other by specification. In fact Wipfel teaches an all or nothing approach. There is also a strong implication in Wipfel that the cluster must contain systems connected by specialized hardware that allows remote probing of memory.

The heart of Wipfel can be found in col. 14, line 61 to col. 16, line 67, where management of resources is described. Here, Wipfel discloses local and shared queues, that are analogous to standard concepts of management of anything in computers (e.g., any operating systems or data base text will discuss these concepts). Wipfel concentrates on the queue management and locking (or avoiding locking) of local and non-local resources. Wipfel is completely silent on resources being inter-related to each other. Wipfel is also silent on a global policy that controls granular use of resources amongst the specified relationships. Wipfel also discusses the fact that local queues may not exist.

Therefore, the presently claimed invention distinguishes over Wipfel for at least these reasons.

The Examiner also states that Wipfel teaches:

selecting at least one resource equivalency from the set of resource equivalencies;
selecting at least one resource from the selected resource equivalence; and
using the selected at least one resource as required by an autonomic computing system.

and cites col. 8, lines 54-58 to col. 9, lines 1-5; col. 11, lines 62-67; and col. 12, lines 61-67 to col. 13, lines 1-15 of Wipfel in support thereof. These citations merely state that when a new node is added to a cluster the other nodes are notified so that they can detect a failure. The new node is given a chance to access the shared disk and request resources from the resource pool. Resources taken from the resource pool can also be returned to the pool when no longer needed.

As stated above, a resource pool is not “resource equivalences” nor does Wipfel teach that a resource equivalency (where each resource within the resource equivalency performs substantially identical services as other resources in the resource equivalency). Wipfel is directed towards the liveness of a node as compared to determining and managing resource equivalencies. Col. 11, lines 62-67 state:

In each of the preceding examples, the attempt to read remote memory succeeded in retrieving a value from that memory. However, if one or more of the interconnections 112 or system area network switches 204 or hardware within the remote device fails, then the remote memory will often be inaccessible, making the remote memory's contents unavailable

This citation has nothing to do with “selecting at least one resource from the selected resource equivalency”. Claims 1 and 8 recite that at least one resource equivalency from a set of resource equivalencies is selected and then at least one resource from the selected resource equivalency is selected. The citation given above merely states that a value is retrieved from a remote memory. This is completely different than the claim element in question. In fact, this citation has nothing to do with selecting a resource at all. Also, based on the Examiner’s other citations, the Applicants can only

assume that the Examiner is comparing the “resource pool” of Wipfel” to the “resource equivalencies” of the presently claimed invention. Assuming *arguendo* that these are the same, which they are not, Wipfel would have to teach that a resource pool from a set of resource pools is selected, which is identify[ed]...based on at least one of a user specification of resource equivalencies, and automatic discovery of resource attributes related to the user specification of resource equivalencies, and then a resource from the selected resource pool is further selected. Wipfel does not teach anything close to this. Accordingly, the presently claimed invention distinguishes over Wipfel for at least these reasons as well.

Col. 12 lines 61-67 to col. 13, lines 1-15 of Wipfel merely state:

Likewise, some embodiments group the conditions differently. For instance, one tracks restarts using epoch values 504 but does not distinguish interconnect 112 hardware failures from remote node 106 hardware failures. Another embodiment reads hardware status registers to obtain more detail regarding hardware failures, such as distinguishing between a loss of power and a loss of signal connection.

As shown in FIGS. 4 and 5, different embodiments also organize the remote memory probe structures in different ways. Some use a read-only register or two while others use RAM that is both remotely readable and remotely writable. Some read the counter 508 directly while others follow an address pointer 500 or additional levels of indirection. Some use only a few bytes or words of memory while others dedicate an entire block or page (probably one having identical physical and logical addresses). Some use all the fields shown in FIG. 5, while others use only a counter 508, or only a counter 508 and validation checksum 510, or some other subset of the fields shown, or supplement the subset with additional information. Some embodiments probe both the interconnect 112 and the remote node 106, while others probe only the interconnect 112 or only the remote node 106

Neither here nor in any other place does Wipfel teach, anticipate, or suggest that the resource selected from the resource equivalence is used “...as required by an autonomic computing system to perform at least one service”. The above citation is

directed towards hardware failures and remote memory probe structures used for detecting node failures. Accordingly, the presently claimed invention distinguishes over Wipfel for at least these reasons as well.

With respect to claims 3 and 10, the Examiner states that Wipfel teaches:

specifying a type of resource class for an autonomic computing system;
creating at least one grouping of resources of the specified type of resource class;
creating a filter from a set of attributes that define a required functional attribute of a type of resource;
removing from the at least one grouping of resources any resource that does not match the filter; and
defining a set of resources remaining in the at least one grouping as an equivalency.

The Examiner cites col. 10, lines 47-60; col. 11, lines 61-67; col. 12, lines 33-45; col. 12, lines 40-45; and col. 12, lines 61-67 in support thereof. It should be noted that the remarks and arguments given above with respect to claims 1 and 8 are also applicable here and will not be repeated.

Col. 10, lines 47-60, is merely directed at the length of time that should pass before memory probing is performed to determine if a cluster is still “alive”. The Applicants have amended claims 3 and 10 to more clearly recite “receiving at least one resource class type specification from a user for an autonomic computing system” Neither here nor anywhere else does Wipfel teach or suggest that a resource class type specification is received from a user. Accordingly, the presently claimed invention distinguishes over Wipfel for at least these reasons as well.

Col. 11, lines 61-67, merely teach that a value may or may not be retrieved from memory to determine if a node is still “alive”. This has nothing to do with “creating at least one grouping of resources of the at least one resource class type”. Accordingly, the presently claimed invention distinguishes over Wipfel for at least these reasons as well.

Col. 12, lines 33-45 merely teach information that can be used to determine a cause of a node failure and selecting steps to compensate for a failure. Wipfel is completely silent on *“creating a filter from a set of attributes that define a required functional attribute of a type of resource corresponding to the resource class type specification received from the user”* and *“removing from the at least one grouping of resources any resource that does not match the filter”*. In fact, this citation has nothing to do with creating a filter, let alone, a filter from a set of attributes that define a required functional attribute of a type of resource or removing a resource that does not match the filter. Accordingly, the presently claimed invention distinguishes over Wipfel for at least these reasons as well.

Col. 12, lines 61-67, merely states “Likewise, some embodiments group the conditions differently. For instance, one tracks restarts using epoch values 504 but does not distinguish interconnect 112 hardware failures from remote node 106 hardware failures. Another embodiment reads hardware status registers to obtain more detail regarding hardware failures, such as distinguishing between a loss of power and a loss of signal connection”. This has nothing to do with resources and is completely silent on *“defining a set of resources remaining in the at least one grouping as an equivalency, wherein each resources in the set of resources perform at least one substantially similar service, the at least one substantially similar service corresponding to the corresponding to the resource class type specification”*. Wipfel does not teach that the at least one substantially similar service corresponds to the resource class type specification. In other words, the resource does not have to be explicitly identical to another resource for the resource to be identified as an equivalent resource. The resources only have to be equivalent with respect to the specification received from the user. Accordingly, the presently claimed invention distinguishes over Wipfel for at least these reasons as well.

With respect to claims 15 and 22, these claims recite similar to claims 1, 3, 8, and 10. Therefore, the remarks and arguments given above with respect to claims 1, 3, 8, and 10, are also applicable here and will not be repeated. However, a few remarks are given below with respect to the remaining elements of claims 15 and 22 not touched upon by

the remarks and arguments given above.

Claim 15 and similarly claim 22, recites:

[...]

a policy generator, communicatively coupled with the memory, for providing in the memory a representation of a system-wide graph of available actions corresponding with each resource in the autonomic computing system; and

an automation engine, communicatively coupled with the resource monitor, with each resource in the autonomic computing system, and with the memory, for providing available actions to at least one available resource in the autonomic computing system, the at least one available resource being selected from at least one available resource represented in the at least one equivalency in order for the autonomic computing system to establish and maintain a desired end state.

The Examiner cites col. 9, lines 35-43, and col. 9, lines 33-67, of Wipfel in support thereof. These citations are merely directed at a probing step for probing memory located in a node. The probing is used to obtain a value that is used for determining if a node is still “alive”. Nowhere does Wipfel teach, anticipate, or suggest a “...system-wide graph of available actions corresponding with each resource in the autonomic computing system...” or “...providing available actions to at least one available resource in the autonomic computing system, the at least one available resource being selected from at least one available resource represented in the at least one equivalency in order for the autonomic computing system to establish and maintain a desired end state...”. Accordingly, the presently claimed invention distinguishes over Wipfel for at least these reasons as well.

As can be seen from the above discussion, the Examiner appears to have improperly broadened Wipfel outside the scope of what Wipfel actually teaches.

The Applicants respectfully remind the Examiner that a proper rejection under 35 U.S.C. § 102(b) requires that a single reference teach (i.e., identically describe) each and

every element of the rejected claims, which Wipfel clearly do not do.¹ Accordingly, the present invention distinguishes over Wipfel for at least this reason as well.

Therefore, in view of the foregoing amendments and remarks, Applicants believe that the rejection of Claims 1, 3, 8, 10, 15, and 22 under 35 U.S.C. § 102(b) has been overcome. Claims 2, 4-7, 9, 11-21, and 23-25 depend from claims 1, 3, 8, 10, 15, and 22, respectively. Since dependent claims include all of the limitations of their independent claim, claims 2, 4-7, 9, 11-21, and 23-25, are believed to also recite in allowable. Accordingly, the Applicants request that the Examiner withdraw the rejection and allow Claims 1-25.

Conclusion

The foregoing is submitted as a full and complete response to the Official Action mailed May 17, 2007, and it is suggested that Claims 1-25 are in condition for allowance. Reconsideration of the rejections is requested. Allowance of Claims 1-25 is earnestly solicited.

No amendment made was related to the statutory requirements of patentability unless expressly stated herein. No amendment made was for the purpose of narrowing the scope of any claim, unless Applicant has argued herein that such amendment was made to distinguish over a particular reference or combination of references.

Applicants acknowledge the continuing duty of candor and good faith to disclose information known to be material to the examination of this application. In accordance with 37 CFR § 1.56, all such information is dutifully made of record. The foreseeable equivalents of any territory surrendered by amendment are limited to the territory taught by the information of record. No other territory afforded by the doctrine of equivalents is

¹ See MPEP §2131 (Emphasis Added) “A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference.” *Verdegaal Bros. v. Union Oil Co. of California*, 814 F.2d 628, 631, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987). “The identical invention must be shown in as complete detail as is contained in the ... claim.”

knowingly surrendered and everything else is unforeseeable at the time of this Response by the Applicants and attorneys.

If the Examiner believes that there are any informalities that can be corrected by Examiner's amendment, or that in any way it would help expedite the prosecution of the patent application, a telephone call to the undersigned at (561) 989-9811 is respectfully solicited.

The present application, after entry of this Response With Amendment, comprises twenty-five (25) claims, including six (6) independent claims. Applicants have previously paid for twenty-five (25) claims including six (6) independent claims. Applicants, therefore, believe that an additional fee for claims amendment is currently not due.

However, a petition for extension of time to timely file this response is hereby incorporated by reference herein. The Commissioner is authorized to charge the appropriate petition fee to avoid this application becoming abandoned to Deposit Account 50-1556.

The Commissioner is hereby authorized to charge any fees that may be required or credit any overpayment to Deposit Account 50-1556.

In view of the preceding discussion, it is submitted that the claims are in condition for allowance. Reconsideration and re-examination is requested.

Respectfully submitted,

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